

CLAIMS:

1. A lithographic projection apparatus comprising:
 - an illuminator that provides a projection beam of radiation;
 - a support structure configured to hold a patterning device that can be used to pattern the projection beam;
 - a substrate table configured to hold a substrate; and
 - a projection system that projects the patterned beam onto a target portion of the substrate,wherein an optical element of at least one of the illuminator and the projection system has a layer comprising Buckminsterfullerenes.
2. An apparatus according to claim 1, wherein the optical element has one or more capping layers on its surface, at least one of said capping layers comprising one or more Buckminsterfullerenes.
3. An apparatus according to claim 2, wherein the outer layer of said one or more capping layers comprises one or more Buckminsterfullerenes.
4. An apparatus according to claim 3, wherein the optical element has a single capping layer on its surface.
5. An apparatus according to claim 2, wherein the optical element has at least two capping layers including an outer capping layer and a sub-capping layer between the outer capping layer and the optical element, said sub-capping layer comprising one or more Buckminsterfullerenes.
6. An apparatus according to claim 5, wherein the sub-capping layer is adjacent to the outer capping layer.
7. An apparatus according to claim 1, wherein the optical element is a multi-layer mirror.

8. An apparatus according to claim 2, wherein the optical element is a multi-layer mirror.
9. An apparatus according to claim 5, wherein the optical element is a multi-layer mirror.
10. An apparatus according to claim 7, wherein a layer comprising one or more Buckminsterfullerenes is present at one or more of the interfaces between any two layers of the multi-layer mirror.
11. An apparatus according to claim 1, wherein the layer comprising one or more Buckminsterfullerenes is from 1 to 3 nm or from 7 to 8 nm in thickness.
12. An apparatus according to claim 2, wherein the capping layer comprising one or more Buckminsterfullerenes has from 1 to 5 layers of Buckminsterfullerene molecules.
13. An apparatus according to claim 2, wherein the capping layer comprising one or more Buckminsterfullerenes has from 2 to 3 layers of Buckminsterfullerene molecules.
14. An apparatus according to claim 1, wherein said one or more Buckminsterfullerenes comprises C₆₀.
15. An apparatus according to claim 1, wherein the projection beam has a wavelength of between 5 nm and 50 nm.
16. A device manufacturing method comprising:
 - providing an optical element having a layer comprising one or more Buckminsterfullerenes; and
 - projecting a patterned beam of radiation via said optical element onto a target portion of a substrate.

17. A lithographic projection apparatus comprising:

- a radiation source that emits a beam of radiation with a wavelength of between 5 nm and 50 nm;
- a support structure configured to hold a patterning device that can be used to pattern the beam of radiation;
- a substrate table configured to hold a substrate; and
- a plurality of mirrors, at least one of which has a layer comprising Buckminsterfullerenes, configured to reflect the beam towards a target portion of the substrate.

18. A lithographic projection apparatus according to claim 17, wherein the at least one mirror comprises one or more capping layers on its surface, at least one of said capping layers comprising one or more Buckminsterfullerenes.

19. A lithographic projection apparatus according to claim 18, wherein the outer layer of said one or more capping layers comprises one or more Buckminsterfullerenes.

20. A lithographic projection apparatus according to claim 18, comprising at least two capping layers including an outer capping layer and a sub-capping layer between the outer capping layer and the surface of the at least one mirror, said sub-capping layer comprising one or more Buckminsterfullerenes.

21. A lithographic projection apparatus comprising:

- a support structure configured to hold a patterning device that can be used to pattern a beam of radiation;
- a substrate table configured to hold a substrate that is patterned by said beam of radiation; and
- a plurality of optical elements, at least one of said optical elements having a layer comprising Buckminsterfullerenes.

22. A lithographic projection apparatus according to claim 21, wherein said at least one optical element is disposed in a path of said beam of radiation.

23. A lithographic projection apparatus according to claim 21, wherein said at least one optical element is in an illuminator.
24. A lithographic projection apparatus according to claim 21, wherein said at least one optical element is in a projection system.
25. A lithographic projection apparatus according to claim 21, wherein said at least one optical element is in a sensor.
26. A lithographic projection apparatus according to claim 21, wherein said beam of radiation has a wavelength of between 5 nm and 50 nm.